

Title (en)
Encoding method and encoding device

Title (de)
Kodierverfahren und Kodiervorrichtung

Title (fr)
Procédé de codage et dispositif de codage

Publication
EP 2523351 A1 20121114 (EN)

Application
EP 12179342 A 20080710

Priority
• EP 08791015 A 20080710
• JP 2007180940 A 20070710

Abstract (en)
The present invention relates to coding method and coding device that allow Rate-Compatible LDPC (low-density parity-check) codes to have favorable BER performance both with a low code rate and with a high code rate. In coding of LDPC codes that have plural code rates and whose all parity check matrices are composed of plural cyclic matrices, a coder 121 performs the coding in such a way that $1 < w_0$ and $w_1 < w_0$ are satisfied when the maximum column weight of the cyclic matrices in the check matrix of a certain code whose code rate is not the minimum value among the LDPC codes is defined as w_0 and the maximum column weight of the cyclic matrices in the check matrix of a code having a code rate lower than that of the certain code is defined as w_1 .

IPC 8 full level
H03M 13/19 (2006.01); **H03M 13/15** (2006.01)

CPC (source: EP KR US)
H03M 13/033 (2013.01 - EP US); **H03M 13/11** (2013.01 - KR); **H03M 13/1102** (2013.01 - EP US); **H03M 13/13** (2013.01 - US);
H03M 13/19 (2013.01 - KR); **H03M 13/6393** (2013.01 - EP US)

Citation (applicant)
• US 2007043998 A1 20070222 - LAKKIS ISMAIL [US]
• R. G. GALLAGER: "Low Density Parity Check Codes", 1963, MIT PRESS
• R. TOWNSEND; E. WELDON, JR.: "Self-Orthogonal Quasi-Cyclic Codes", IEEE TRANS. INFO. THEORY, vol. IT-13, no. 2, April 1967 (1967-04-01), pages 183 - 195, XP000760903, DOI: doi:10.1109/TIT.1967.1053974
• Y. KOU; S. LIN; M. FOSSORIER: "Low Density Parity Check Codes on Finite Geometries: A Rediscovery and New Results", IEEE TRANS. INFO. THEORY, vol. 47, no. 7, November 2001 (2001-11-01), pages 2711 - 2735, XP002275913, DOI: doi:10.1109/18.959255
• M. NODA: "Designing a Self-orthogonal Quasi-cyclic Code with Extended Minimum Hamming Distance", PROC. 4TH INTERNATIONAL SYMPOSIUM ON TURBO CODE AND RELATED TOPICS, April 2006 (2006-04-01)
• M. FOSSORIER: "Quasi-cyclic Low-density Parity-check Codes From Circulant Permutation Matrices", IEEE TRANS. INFO. THEORY, vol. 50, no. 8, August 2004 (2004-08-01), pages 1788 - 1793
• T. J. RICHARDSON; R. L. URBANKE: "Efficient Encoding of Low-density Parity-check Codes", IEEE TRANS. INFO. THEORY, vol. 47, no. 2, February 2001 (2001-02-01), pages 638 - 656, XP002965294, DOI: doi:10.1109/18.910579
• D. KLINC; J. HA; J. KIM; S. W. MCLAUGHLIN: "Rate-compatible Punctured Low-density Parity-check Codes for Ultra Wide Band System", PROC. IEEE (GLOBECOM 2005, 2005, pages 3856 - 3860, XP010881470, DOI: doi:10.1109/GLOCOM.2005.1578492
• H-G. JOO; D-J SHIN; S-N. HONG: "New Construction of Rate-compatible Block-type Low-density Parity-check Codes using Splitting", PROC. IEEE (PIMRC 2006, September 2006 (2006-09-01)

Citation (search report)
• [AD] US 2007043998 A1 20070222 - LAKKIS ISMAIL [US]
• [A] WO 2006001015 A2 20060105 - RUNCOM TECHNOLOGIES LTD [IL], et al
• [X] SHU LIN ET AL: "Near shannon limit quasi-cyclic low-density parity-check codes", GLOBECOM'03. 2003 - IEEE GLOBAL TELECOMMUNICATIONS CONFERENCE. CONFERENCE PROCEEDINGS. SAN FRANCISCO, CA, DEC. 1 - 5, 2003; [IEEE GLOBAL TELECOMMUNICATIONS CONFERENCE], NEW YORK, NY : IEEE, US, vol. 4, 1 December 2003 (2003-12-01), pages 2030 - 2035, XP010678585, ISBN: 978-0-7803-7974-9, DOI: 10.1109/GLOCOM.2003.1258593
• [X] LIANG CHEN ET AL: "Flexible hardware encoding schemes for extended quasi-cyclic low-density parity-check codes", SIGNAL PROCESSING AND ITS APPLICATIONS, 2007. ISSPA 2007. 9TH INTERNATIONAL SYMPOSIUM ON, IEEE, PISCATAWAY, NJ, USA, 12 February 2007 (2007-02-12), pages 1 - 4, XP031280733, ISBN: 978-1-4244-0778-1
• [X] DONGSHENG LIN ET AL: "Semi-random construction of quasi-cyclic LDPC codes", COMMUNICATIONS, CIRCUITS AND SYSTEMS, 2005. PROCEEDINGS. 2005 INTERNATIONAL CONFERENCE ON HONG KONG, CHINA MAY 27-30, 2005, PISCATAWAY, NJ, USA, IEEE, vol. 1, 27 May 2005 (2005-05-27), pages 9 - 13, XP010827164, ISBN: 978-0-7803-9015-7, DOI: 10.1109/ICCCAS.2005.1493351
• [X] ZHICHU LIN ET AL: "A New Design Method of Multi-Rate Quasi-Cyclic LDPC Codes", 2006 INTERNATIONAL CONFERENCE ON COMMUNICATIONS, CIRCUITS AND SYSTEMS : GUILIN, GUANGXI, CHINA, 25 - 28 JUNE 2006, IEEE SERVICE CENTER, PISCATAWAY, NJ, 1 June 2006 (2006-06-01), pages 707 - 711, XP031010530, ISBN: 978-0-7803-9584-8
• [AD] HYEONG-GUN JOO ET AL: "New Construction of Rate-Compatible Block-Type Low-Density Parity-Check Codes Using Splitting", PERSONAL, INDOOR AND MOBILE RADIO COMMUNICATIONS, 2006 IEEE 17TH INTERNATIONAL SYMPOSIUM ON, IEEE, PI, 1 September 2006 (2006-09-01), pages 1 - 5, XP031023722, ISBN: 978-1-4244-0329-5
• [AD] TOWNSEND R ET AL: "Self-orthogonal quasi-cyclic codes", IEEE TRANSACTIONS ON INFORMATION THEORY, IEEE, US LNKD-DOI:10.1109/TIT.1967.1053974, vol. 13, no. 2, 1 April 1967 (1967-04-01), pages 183 - 195, XP002551439, ISSN: 0018-9448
• [A] VILA CASADO A I ET AL: "Multiple rate low-density parity-check codes with constant blocklength", SIGNALS, SYSTEMS AND COMPUTERS, 2004. CONFERENCE RECORD OF THE THIRTY-EIGHTH ASILOMAR CONFERENCE ON PACIFIC GROVE, CA, USA NOV. 7-10, 2004, PISCATAWAY, NJ, USA, IEEE LNKD- DOI:10.1109/ACSSC.2004.1399517, vol. 2, 7 November 2004 (2004-11-07), pages 2010 - 2014, XP010781157, ISBN: 978-0-7803-8622-8

Designated contracting state (EPC)
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

DOCDB simple family (publication)

EP 2164178 A1 20100317; EP 2164178 A4 20100811; CN 101689868 A 20100331; CN 101689868 B 20130508; EP 2523351 A1 20121114; JP 2009021676 A 20090129; JP 4858335 B2 20120118; KR 20100039294 A 20100415; US 2010153823 A1 20100617; US 2014013180 A1 20140109; US 8543887 B2 20130924; US 8843802 B2 20140923; WO 2009008460 A1 20090115

DOCDB simple family (application)

EP 08791015 A 20080710; CN 200880024154 A 20080710; EP 12179342 A 20080710; JP 2007180940 A 20070710; JP 2008062441 W 20080710; KR 20097027418 A 20080710; US 201314026919 A 20130913; US 60104608 A 20080710